THE CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

CRES Report

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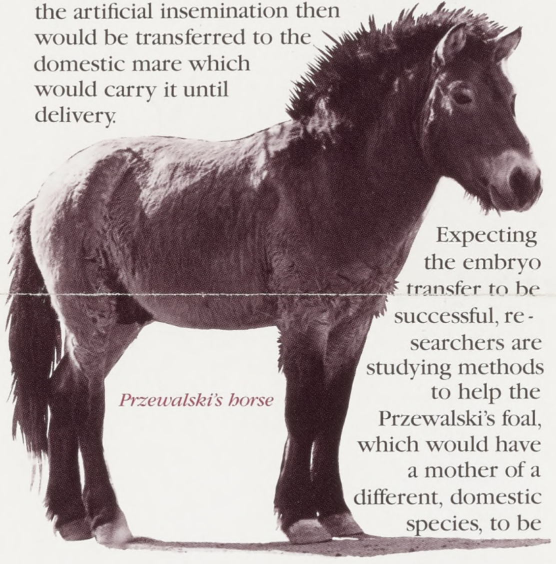
The goal of the embryo transfer program at CRES is simple to state: to produce viable members of a species. But the task of accomplishing that goal is complex.

A case in point is CRES researchers' embryo transfer work with the Przewalski's horse. CRES is currently working with a mare which possesses very valuable gene lines but is too aggressive for natural breeding. Because of her advanced age, the mare rarely ovulates on her own, so a hormone pump has been implanted to stimulate ovulation. If ovulation occurs, the mare will be artificially inseminated.

At the same time, researchers will be working to synchronize the estrous cycle of a domestic mare to that of the Przewalski's horse. In the first such procedure of its kind, an embryo resulting from the artificial insemination then would be transferred to the domestic mare which would carry it until delivery.


Przewalski's horse

Expecting the embryo transfer to be successful, researchers are studying methods to help the Przewalski's foal, which would have a mother of a different, domestic species, to be accepted by its own species. Such acceptance is vital if the foal is to develop into a viable, reproducing member of its own sociobiological group.

Though the task is complex, the potential benefits make the work well worthwhile. The embryo transfer program could dramatically increase foal production of the endangered Przewalski's horse. With a gestation period of 11 to 12 months, a normal mare could ordinarily only produce a maximum of one foal per year. By conducting an embryo transfer for each estrous cycle of a healthy mare, that number could potentially increase sixfold. ■

You've heard the expression, "Timing is everything." Nowhere are the words more true than in CRES' attempts to breed Asian elephants.

Healthy females are fertile only one or two days every 16 weeks, so their chances of becoming pregnant are few and far between. Adding to the complication is the fact that the male Asian elephant is highly aggressive, prone to injure the female rather than woo her gracefully. Thus the animals must be kept apart most of the time, but brought together at the exact right moment for breeding to occur.

For CRES researchers, the challenge has been knowing when "the exact right moment" is for breeding or artificial insemination. Estrogen levels should rise prior to ovulation, but they are too low in blood samples to assess accurately. What's more, collecting daily blood samples may be too stressful for the animals.

Thus CRES has turned to analyzing urinary hormones, with initial research proving successful in indicating time of ovulation. However, because such tests take several days to complete, they do not produce results in time to make the necessary arrangements for breeding. CRES now is working to develop ways to speed up the urinary tests, examining for fecal excretion of steroids, and testing for hormones in saliva.

The means to achieve perfect timing may be elusive, but efforts to save the Asian elephant are alive and well at CRES. ■

Lion-tailed macaques

After years of experimenting with methods to reduce stress among lion-tailed macaques, improve their living conditions and understand their behavior, CRES researchers were very encouraged by the birth this past year of four macaques—the most ever in the Zoo's history.

Reproductive failure among these delightful monkeys is, however, still a significant concern. With populations dropping at many zoos worldwide, CRES is working to determine why such a high percentage of female macaques in captivity are unable to reproduce, despite mating regularly and appearing otherwise healthy.

Hormone studies indicate that ovulation is occurring in several of the infertile females, so CRES is now turning its attention toward the reproductive tract to determine if anatomical abnormalities exist and can be surgically corrected. ■

When three Temmincks tragopan chicks poked their heads through their shells last summer, it was good news for a number of endangered species of birds. The three successful hatchings capped months of experimentation and research of semen collection and artificial insemination techniques.

Researchers at CRES are now turning their attention to six additional species to work with in 1987. Among these will be the Chinese monal, the rarest bird in captivity. There is but one pair of this bird outside China, and, because of a leg injury which makes it too uncomfortable for the female to support the weight of the male, the pair is no longer breeding. With the expertise gained from working with the Temmincks tragopan, CRES is now attempting to produce Chinese monal chicks through artificial insemination.

In addition to working with the Chinese monal and continuing work with the Temmincks tragopan, CRES is beginning artificial insemination programs for Himalayan monals, black vultures, ground hornbill and Congo peafowl. ■

Rhinoceroses are disappearing from the wild.

In the past year alone, half the rhino population in Africa is believed to have been lost to poaching. Populations worldwide are estimated to be 10 percent of their 1970 levels.

In response to this crisis situation, CRES researchers have undertaken studies of the genetic makeup of rhinos—research which is crucial to the success of captive breeding programs to preserve vital gene lines.

Because this is a relatively new area of genetic research, the first task—no small feat in itself—was to establish a collection of rhinoceros blood and skin samples to grow cell lines on which experiments could be performed.

A CRES researcher traveled to Czechoslovakia and back to obtain samples from the only breeding group of northern white rhinos, which are the most severely endangered of the rhinos with less than 30 animals alive worldwide. His efforts have contributed to the fact that CRES possesses the world's most extensive collection of rhino blood and skin samples. More important, these magnificent beasts have a better chance to return from the brink of extinction. ■

Painstaking exotic animal research can try the patience of even the most dedicated scientists. Progress most often is measured in inches rather than miles. However, there is good news to report on the effort to develop an effective vaccine against the chronic liver diseases which strike exotic cats, especially the endangered snow leopard.

After months of working with samples from the livers of cats which have died from the disease, CRES has isolated what may be the cause: a virus related to hepatitis B of humans.

While there is still a long way to go, isolating the virus is an important milestone on the road to developing an effective vaccine. ■

Caution! Exotic animal research can be dangerous. Just ask the CRES researcher who lives to tell the story of how he crossed international borders with a smoking metal cannister filled with rhino skin and blood samples protected in liquid nitrogen—and how he explained to curious government officials that the cannister absolutely could not be opened for inspection. The point of his excursion was to save northern white rhinos from disappearing from this earth, so his determination was strong to bring the cannister safely to San Diego. ■

Komodo dragon

Though a little iguana can't hatch a huge Komodo, knowledge gained from iguana reproduction work at CRES might.

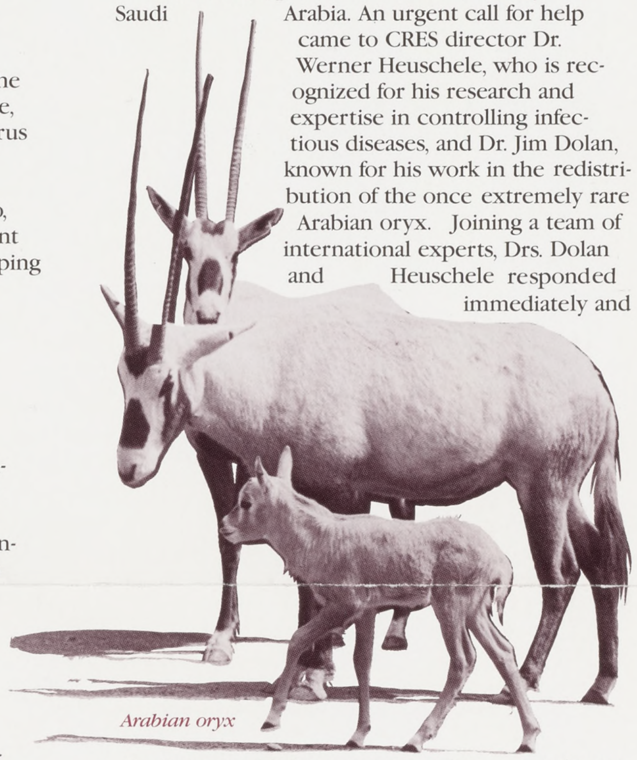
By implanting tiny hormone pumps in gravid iguanas from Belize, researchers at CRES have been able artificially to induce breeding during the normally quiescent phase of the iguana's breeding cycle.

Encouraged by the results of their work with the iguanas, the researchers have adapted this technique to other lizard species, most notably the last Komodo monitor in the Zoo's collection. Though this 18-year-old, 38-pound female has never laid eggs, examinations have not revealed anything wrong with her reproductive system.

CRES has implanted an external pump the size of three stacked coins into the Komodo's shoulder. Preliminary readings of hormone levels indicate a slight ovarian response. But even such modest results are encouraging as CRES seeks to understand this specie's reproductive cycle, about which relatively little is known. ■

When an infectious disease strikes an endangered species, years of careful research and selective breeding programs can be suddenly wiped out.

This nearly occurred last summer when tuberculosis struck a prized herd of Arabian oryx in Saudi Arabia. An urgent call for help came to CRES director Dr. Werner Heuschele, who is recognized for his research and expertise in controlling infectious diseases, and Dr. Jim Dolan, known for his work in the redistribution of the once extremely rare Arabian oryx. Joining a team of international experts, Drs. Dolan and Heuschele responded immediately and set about establishing a system of testing and treating the oryx.


Arabian oryx

Though the disease has claimed almost half the herd of 53, researchers are closely monitoring the remaining oryx and are hopeful that vital gene lines can be preserved. Since their return, Drs. Heuschele and Dolan continue to advise the herd's keepers, and they have been invited by Prince Saud Al Faisal to return to Saudi Arabia to participate in a February symposium addressing wildlife conservation and development efforts in Saudi Arabia. Offering such consultation is a vital part of the efforts of CRES to ensure that preventive medical considerations are given a high priority in endangered species reintroduction programs. ■

The Center for Reproduction of Endangered Species (CRES) is operated by the Zoological Society of San Diego, a non-profit organization.

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